

Acceptance of the Mineralogical Society of America Award for 2009

THOMAS P. TRAINOR

Fairbanks Department of Chemistry and Biochemistry, University of Alaska, Fairbanks, Alaska 99775, U.S.A.

First and foremost, I would like to thank my colleagues who nominated me for this award and thank the selection committee and the Mineralogical Society of America for this great honor; it is truly the highlight of my career. I would also like to thank the organizers of the Frontiers in Mineral Sciences Session at the Geological Society of America Meeting held in honor of this year's award recipients. This session presented a phenomenal array of high impact talks, and it was both very humbling and a great honor to share the session with Alexandra Navrotsky, the 2009 Roebling Medal winner, who is truly a pioneer and intellectual leader in the mineral sciences.

When reflecting on the work that led to the MSA award, it was very clear to me that this is a shared award among the many colleagues and collaborators that took part in the studies. It was also clear that I have had very good fortune to work with a highly talented and motivated group of individuals, and that I was lucky to be in the right place at the right time. In order to thank some of the people that have contributed to my progress over the last decade, I would like to briefly note some key individuals, chronologically.

I began my scientific career as an undergraduate in the Department of Chemistry and Geochemistry at the Colorado School of Mines where Tom Wildeman and Don Macalady started me on my path by fostering my interests in geochemistry, physical chemistry and environmental chemistry. While at Mines, I was introduced to the importance of surface processes in geochemical systems, and the complexity of the mineral-fluid interface was a problem that seemed highly appealing to me to pursue. It was also during this period that I worked with Rich Goldfarb at the U.S. Geological Survey who introduced me to field studies in the Chugach Mountains of coastal Alaska—my time pounding through the rain forest collecting samples and subsequent travels around the state allowed me to discover the region that I am happy to now call home.

From CSM, I went on to Stanford University to pursue a Ph.D. with Gordon Brown. Gordon has been an immense influence on my career and approach to science and I couldn't thank him enough for his support and collaboration while I was in his group at Stanford and beyond. Gordon is tireless in his research output, his efforts for the mineralogy and geochemical communities, and in particular for his students. I would like to thank him for all that he has done for me.

At Stanford, I had the great fortune of learning mineralogy, crystallography, geochemistry, and physical chemistry from leaders in the disciplines. And it was at Stanford that I feel like



I became part of a scientific family; primarily that established by the research group of Gordon Brown and George Parks. At meetings and conferences it is very apparent that we are part of a tight knit scientific community (for example I earlier had the pleasure of introducing Gerry Gibbs to his scientific great-granddaughter Sarah Petitto), and I am particularly glad to be associated with the disciplines of mineralogy and geochemistry.

While I was at Stanford, I had the pleasure of interacting with many other students, faculty and staff who have had a big impact on my career. Those that pioneered the way for synchrotron studies of mineral surface structure and reactivity include John Bargar, Hillary Thomson Berbeco, Sean Brennan, Bruce Clemens, Sing Foong-Cheah, Tom Kendelewicz, Ping Liu, Peggy O'Day, Maria Peterson, Steve Towle, and Glenn Waychunas. My peers who shared experiments and trouble shooting at the beamline include Jeff Catalano, Colin Doyle, Jeff Fitts, Andrea Foster, Daniel Grolimund, Chris Kim, John Ostergren, and Alexis Templeton. The collaborations and friendships developed during this time have endured. In particular, Alexis Templeton has been, and continues to be, a major influence on my approach to defining and solving interesting problems.

It was also while a graduate student that I began working with The University of Chicago GeoSoilEnviroCARS group at the Advanced Photon Source, Argonne National Laboratory. Again

I was lucky to have the opportunity to work with a remarkably talented group of scientists, including Peter Eng, Matt Newville, Steve Sutton, and Mark Rivers. I was also fortunate to begin working there (first as a student and later as a post-doc) just as the new capabilities were coming on-line for performing surface diffraction and spectroscopy measurements. These new experimental capabilities allowed us to carry out direct and highly detailed measurements of the structure of mineral-fluid interface systems that was not possible prior their coming on-line. I feel that to a large extent the MSA award is another recognition of the important contribution GSECARS has made to experimental Earth and Environmental Sciences.

While working as a post-doc at GSECARS, I had the good fortune to initiate a collaboration with Anne Chaka. Anne has been the driving force for developing a theoretical understanding of mineral interface systems using first principles computational methods. She has taught me a great deal about theoretical and computational chemistry, and more important, how to link theory and experiment which is critical to understanding what drives complex systems.

I moved on from Chicago to a faculty position at the University of Alaska Fairbanks, where I have continued to work on problems related to the structure and reactivity of mineral surfaces, including the application of surface crystallography experimental work coupled with theoretical computations and studies of trace element geochemistry and the role of heterogeneous processes in partitioning and sequestration of metals. UAF has been very supportive, and afforded me an opportunity to live and work in an extraordinary environment. I have also been lucky again in my first years to have worked (as primary advisor or on collaborative projects) with a great group of students and post-docs including Ashley Jones, Sanjit Ghose, Chris Iceman, Juyoung Ha, Anastasia Ilgen, Cynthia Lo, Sara Mason, Raena Rowland, Sarah Petitto, Vanessa Ritchie, Kunal Tanwar, and Kristen Williams.

Again, I would like to say that I feel honored and very appreciative of being selected for the MSA award, and I would like to thank everyone who had a part in making this happen. Finally, I would like to thank my wife Sarah Trainor for the support she has provided.